



ATTY. DOCKET NO.: 96CAD01CIP

IN THE UNITED STATES PATENTS & TRADEMARK OFFICE

Application of:

Rassoll Rashidi

Serial No.:

09/232,866

Examiner: Schaetzle, K.

FOR:

Electrophysiology/Ablation Catheter
and Remote Actuator Therefor

Filed:

January 15, 1999

RECEIVED

Art Unit: 3762

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TECHNOLOGY CENTER R3700

**Hon. Commissioner of
Patents & Trademarks
Washington, D.C. 20231**

Sir:


DECLARATION UNDER 37CFR1.132

Majid Rashidi solemnly affirms and declares that:

- 1- Declarant is the holder of a Doctor of Philosophy (Ph.D.) degree in Mechanical Engineering from Case Western Reserve University, Cleveland, Ohio;
- 2- Since 1987 declarant has been continuously employed as a professor at Cleveland State University, Cleveland, Ohio where he is a full time faculty member in the Department of Mechanical Engineering, and teaches undergraduate and graduate courses in the general area of machinery, kinematics, dynamics, machine design, and vibrations of machinery. In addition to his teaching duties at CSU, declarant has experiences as an industrial problem-solving consultant in the design of machinery and has received three grants from NASA Glenn Research Center for mechanical dynamics analysis;
- 3- Declarant has been provided with a copy of and has carefully read the above referenced application of Rassoll Rashidi,, the Office Action dated June 19, 2001, and the referenced U.S. Patents 5,853,409 to Swanson, et al and 5,254,088 to Lundquist et al;
- 4- Declarant has noted that on page 4 paragraph 13 of the aforesaid Office Action the Examiner, with reference to the Swanson et al '409 Patent refers to: " a pair of flexible tension/compression members in side-by-side relationship --- and flexible spacer means 36 disposed between the pair of flexible tension/compression members at the distal end. Regarding the "wherein" clause (indent (e)), it would appear that longitudinal tensioning of a first of said members 34 would simultaneously result in a longitudinal compression of a second of said members and vice versa";

- 5- Declarant, having reviewed the Swanson et al '409 patent, finds that the Examiner's statements noted above are not correct. Specifically, the two members **34** of Swanson et al are both only tension members and not tension/compression members **34**. The two members **34** of the Swanson et al '409 patent are alternately in tension only. When one of the two members **34** of Swanson et al '409 is in tension, the other is slack and vice versa. In the structure of Swanson et al '409 the member **36** takes all compression loading, and members **34** are not loaded in compression during flexing of the Swanson et al '409 device.
- 6- Unlike the device in the present application, the Swanson et al '409 device does not have a flexible spacer between the pair of tension/compression members. In the Swanson et al '409 device, the compression member 36 is disposed between the alternately tensioned members **34**; as explained on page 47 at paragraph 2 of the applicant's specifications.
- 7- Declarant states that in the device of the present invention, when either one of the members **304, 306** respectively is in tension, the other is in compression but the spacer **310** is in neither tension nor in compression: member **310** is longitudinally free at its proximal end and thus free floating;
- 8- In the device described in the present invention, the flexible spacer **310** is anchored only at the distal end, is otherwise free floating and is not subjected to either tension or compression loading during the flexing of the catheters distal portion; and,
- 9- Declarant has also reviewed the Lunsquist et al patent '088 and finds that Lundquist et al teaches in Figs 7 and 8 thereof a catheter utilizing a pair of tension only members **360, 370** disposed on the opposite sides of a separate compression strut or compressive load-bearing member **350** and is typical of the prior art devices disclosed in applicants' specifications at page 6-8 and has the disadvantage of rather sudden movement across the neutral position (straight configuration at the catheter's distal portion)
- 10- Unlike the catheters describe in prior art, the catheter shown and described in the present new invention does not have a compression member at its distal portion acting as a strut. The compression load during flexing of the distal portion of the catheter is carried alternately by only one of the tension/compression members **304** and **306**. The mechanical function of the free-floating spacer **310**, disposed between the tension/compression members **304** and **306** in the present invention, is to create a smooth transition for the curve-able distal portion of the catheter as the distal portion is curved from one direction into an opposite direction. In other words, the free-floating spacer **310** of the present invention creates a stable neutral position (straight configuration) at the distal portion of the catheter. From the catheter maneuvering point of view, the longitudinally free-floating spacer **310** of the applicants' catheter functions to facilitate a smooth transition of one of the members **304, 306** from tension to compression as the user reverses the direction of flexing or curvature, by virtue of preventing rotational instability about the longitudinal axis of the respective members **304, 306** undergoing compression loading; and,

11- I hereby acknowledge that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United State Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.


Majid Rashidi, Ph.D.
Associate Professor of ME Dept.
Cleveland State University

Cleveland, Ohio
September 13, 2001

Majid Rashidi, Ph.D.
Associate Professor
Mechanical Engineering Department
Cleveland State University,

Majid Rashidi
33626 Lombardy lane
Pepper Pike, Ohio 44124

TEACHING AND RESEARCH OBJECTIVE:

To teach and pursue independent research in machine design, bearing design, vibrations of rotating machinery, and fluid-solid interactions in machinery

EDUCATION:

Case Western Reserve University, Cleveland, Ohio:

January 1987 Ph.D. in Mechanical Engineering

August 1983 M.S. in Mechanical Engineering

May 1981 B.S. in Mechanical Engineering (With high honors)

TEACHING ACTIVITIES AND EXPERIENCE:

Cleveland State University, Cleveland, Ohio

- | | |
|--|-------------------------------|
| - Introduction to Engineering Design..... | (Freshman level) |
| - Kinematics | (Sophomore level) |
| - Machine Analysis | (Junior level) |
| - Machine Design | (Junior level) |
| - Engineering Graphics | (Junior level) |
| - Theory of Lubrication and Bearing Design | (Senior/graduate level) |
| - Dynamics of Machinery | (Senior level) |
| - Design Seminar | (Senior level) |
| - Design Project | (Senior level) |
| - Theory of Linear Control | (Senior level) |
| - Advanced Dynamics | (Graduate level) |
| - Finite Element | (Graduate level at NASA) |
| - Advanced Vibrations | (Graduate level at NASA) |
| - Nonlinear Dynamics | (Graduate level) |
| - Lubrication | (Graduate level) |
| - Tissue Engineering | (Graduate level, Bio Medical) |

TEACHING AWARDS:

Elected as the **Faculty Member of the Year** in the Mechanical Engineering Department for the **Academic Years: 88-89, 89-90, 90-91, 91-92, 92-93, 93-94, and 94-95**, Elected as the most favorite faculty of the ME Department by the seniors in 2001.

Research In progress:

- Conducting research on the Flow Induced Vibrations of Tubes. Masters Thesis in progress.
- Mathematical Modeling of Helical Spring Vibrations with Variable Coulomb Damping, Masters Thesis in Progress.
- Mathematical Modeling of the Performance of Journal Bearing with Variable Radial Clearance, Masters Thesis in Progress.
- Dynamics of Bearing Cage in a rolling Element Bearing, Masters Thesis in Progress.

Unfunded Research Proposals:

- Study of Journal Bearings Lubricated with Molten Zinc, NFS Proposal, Budget: \$419, 575.00, PI: Majid Rashidi, 1999.
- Reducing Defects in Continues Casting Production Via Measurement and Monitoring of Mold Level and Mold-Slab Friction, CAMP Applied Research Proposal, Budget: \$171,280.00

Invited Seminars:

- Northeastern University, Mechanical Engineering Research Colloquium Series, October 28, 1994, Boston Massachusetts, "Dynamics of Split Torque Transmission, Mathematical Modeling", by Majid Rashidi, Associate Professor of ME Department at CSU.
- Miami University, Seminar Program, Department of Mechanical Engineering Graduate Seminar Series, February 3, 1995, Miami. Florida, "Dynamics of Split Torque Transmission, Mathematical Modeling", by Majid Rashidi, Associate Professor of ME Department at CSU.

Graduate Thesis/Dissertations directed as Principal Advisor:

- Masters Thesis: 10 Student names and thesis titles available upon request
- Doctoral Dissertations: 1, Student name and dissertation title available upon request.

COURSE DEVELOPMENT:

- Developed a graduate level course (Bio Medical Doctoral level) for the joint Bio-Medical Engineering program of the Fenn College and the Cleveland Clinic Foundation. This course was offered in Fall of 2000, and it was taught by myself for the first time.
- Developed a freshman level course (Freshman Engineering Design, ESC 120). This course. This course was offered in Fall of 2000, and it was taught by myself for the first time.
- Developed four graduate level course in the Mechanical Engineering Department at Cleveland State University, these courses are: **Advanced Dynamics, Nonlinear Dynamics, Viscoelasticity, and Advanced Theory of Lubrications,**

Industrial Research and Grants:

- Received an industrial research project for identifying the bearing failure causes of the GE's Lighting Primary Coiling Machine that is employed in fabrication of the tungsten wire filament of the light bulbs of a two-component foam dispensing gun for Fomo Products, Inc. in Barberton, Ohio, US Patent has been allowed.
Principal Investigator: Majid Rashidi, (Amount: \$8,800.00).
Spring of 2001 (AMC Project).

Received an industrial research project for development of a mathematical modeling of the cooling of rubber sheets during manufacturing of automobile tires for Mathews Conveyors Co. in Danville, Kentucky.

Principal Investigator Majid Rashidi, (Amount: \$19,200.00).
Spring of 1999 (AMC Project).

- Received an industrial research project for development of a two-component foam-dispensing gun for Fomo Products, Inc. in Barberton, Ohio, Patent application in Progress.
Principal Investigator: Majid Rashidi, (Amount: \$34,000.00).
Spring of 1999 (AMC Project).
- Received an industrial research project for development of a Brazing Machine for Marine Mechanical, Corp. in Cleveland, Ohio.
Principal Investigator: Majid Rashidi, (Amount: \$35,500.00).
Summer of 1999 (AMC Project).

Industrial Research and Grants (continued):

- Received an industrial research project for development of a front mount reel hose assembly for sewer cleaning trucks, US Patent 6,059,214
(Inventor: Majid Rashidi)
Principal Investigator: Majid Rashidi, (Amount: \$28,000.00).
Summer of 1997 (AMC Project).
- Received an industrial research project for troubleshooting and design modification of a pneumatic pump.
Principal Investigator Majid Rashidi, (Amount: \$14,000.00).
Summer of 1997 (AMC Project).
- Received an industrial research project for designing of a Fan-Pulley for a high pressure spray painting system for AccuSpary in Beachwood, Ohio.
Principal Investigator: Majid Rashidi, (Amount: \$5,600.00).
Spring of 1997 (AMC Project).
- Received an industrial research project for designing of a muffler system for a high pressure spray painting system for AccuSpary in Beachwood, Ohio.
Principal Investigator: Majid Rashidi, (Amount: \$6,000.00).
Winter of 1997.
- Received a grant from Sawyer Research Institute, Euclid, Ohio, to design a pump for an extremely hostile environment.
Principal Investigator: Majid Rashidi, (Amount: \$32,000.00). 1994-1996
- Received a core-project grant from the Advanced Manufacturing Center, Cleveland, Ohio, to study various methods of part handling for automation of mechanical processes,
Principal Investigator: Majid Rashidi, (Amount: \$30,000.00).
Grant Number: 2133370648, 1994-1995.
- Received a grant from NASA Lewis Research Center, Cleveland, Ohio, for a Mathematical Modeling of a Split Torque Helicopter Transmission,
Principal Investigator: Majid Rashidi,
(Amount: \$21,000.00)
Grant Number: RAS-R2, 1993-1994.
- Received a grant from HP Product, Inc., Mansfield, Ohio, to improve flow patterns in a bag-less vacuum cleaner.
Principal Investigator: Majid Rashidi, (Amount: \$19,000.00). 1993-1994

Industrial Research and Grants (continued) :

- Received a grant from NASA Lewis Research Center, Cleveland, Ohio, for a Mathematical Modeling and Experimental Investigation of the Dynamics of a Split Torque Helicopter Transmission,
Principal Investigator: Majid Rashidi, (Amount: \$36,000.00)
Grant Number: RAS-R2, 1991-1992.
- Received a grant from NASA Lewis Research Center, Cleveland, Ohio, for a Mathematical Modeling of a Split Torque Helicopter Transmission,
Principal Investigator: Majid Rashidi, (Amount: \$36,000.00)
Grant Number: RAS-R2, 1990-1991.
- Received a grant from State of Ohio (Edison Program) for design and design optimization of a Rotary Braiding Machine,
Principal Investigator: Majid Rashidi, (Amount: \$50,000.00)
Grant Number: RAS-R1, 1991-1993.
- Received an industrial research project from AccuSpray Company, Cleveland, Ohio, to design a Four Stage Centrifugal Air Compressor
Principal Investigator: Majid Rashidi, (Amount: \$29,950.00). 1991-1992
- Received a Gift-in-Kind, Bently Nevada Corp., Minden, Nevada, a complete Rotor Kit test rig which is to be used in undergraduate dynamics lab at Cleveland State University. 1988, **\$10,000.00** value.
- International Gas Turbine Institute, 1990, **\$1,000.00**.

CONSULTING:

- Provided expert witness opinion on behalf of a Land Clearing Company in Ohio, in a litigation for discovering design flaw of a Heavy equipment land Clearing Machine. The case was settled to the satisfaction of the Land Clearing Company based on the provided expert opinion.
- Provided expert witness opinion on behalf of city of Mentor, Ohio, in a litigation for discovering design flaw of a waste water plant screw pump. The case was settled to satisfaction of city of Mentor based on the provided expert opinion.
- Designed a Ten Stage Centrifugal Air Compressor (including the support journal bearings) for the Bessam-Aire Inc., Cleveland, Ohio. This project received the **Application of New Technology** award from NATIONAL INSTITUTE OF STANDARDS and TECHNOLOGY, Washington D.C., 1991.

Patents:

- 1) Designed a Universal Catheter Tester for testing the electrical integrity of the Electrophysiology and ablation Catheters, **Inventor: Majid Rashidi**
US patent No. 5, 552,713, this patent is assigned to Cardiac Assist Devices, Inc. in Cleveland, Ohio, Patent date: September 3, 1994
- 2) Designed a Front Mount Hose Reel Assembly for Sewer Cleaning Trucks, **Inventor: Majid Rashidi, Patent Number: 6,0592,14**. The patent is assigned to Cleveland State University, Patent date, March 9, 2000.
- 3) Design of a Two Component Gun Design for Foam Dispensing Application, Patent has been allowed on March 9, 2001, **Inventor: Majid Rashidi Serial No.: 09/516,979**, The patent is assigned to Cleveland State University.

PUBLICATIONS:

- 1) M. Rashidi, A.B. Ebiana, M. Gedeon "Journal Bearing Performance in presence of Dross in Galvanizing Process", submitted to ASM Journal of Materials Engineering and Performance. Submitted June 2001.
- 2) M. Rashidi, A.B. Ebiana, M.L. Adams, M. Gedeon "Effects of Dross on Dynamics of Journal Bearings Lubricated with Molten With Molten Zinc," 1999 STLE and ASME Tribology Conference, Oct.11-13, 1999.
- 3) M. Rashidi, A.B. Ebiana, J.T. Sawicki, R. Sinnadurai "Effects of Turbulence and Lubricant Inertia on Dynamics of Journal Bearings Lubricated with Molten With Molten Zinc in a Galvanizing Processes, ASM Journal of Materials Engineering and Performance Vol. 5, No. 6, December of 1996, pp 710-727.
- 4) M. Rashidi, "Design of a Hydraulic Actuator for Active Control of Rotating Machinery", Journal of Engineering for Gas Turbines and Power, Transaction of ASME, 1993, Vol. 115, No. 2, pp 336-340.
- 5) M. Rashidi, T. Krantz, "Dynamics of a Split-Torque Helicopter Transmission," Proceedings of 1992 International Transmission Gearing Conference of American Society of Mechanical Engineers, Published by ASME Design Engineering Division, Vol. 43, Part I, pp 347-358.
- 6) M. Rashidi, "Design and Analysis of Journal Bearings Lubricated With Molten Zinc For Galvanizing Processes, ASM Journal of Materials Engineering and Performance Vol. 1, No. 3, June 1992, pp 323-331.
- 7) Ioan Pop, R.S.R. Gorla, M. Rashidi, "The Effect of Variable Viscosity of Flow and Heat Transfer to a Continuous Moving Flat Plate,"International Journal of Engineering and Science, Vol. 30, No.1, 1992, pp 1-6.
- 8) Ioan Pop, M. Rashidi, R.S.R. Gorla, "Mixed Convection to Power-Law Type Non-Newtonian Fluid from a Vertical Wall, Journal of Polymer-Plastic Technology & Engineering, 1990, pp 47-65.
- 9) M. Rashidi, "An Alternative Computational Approach To Active Control of Dynamic Systems", Proceedings of the 7th International Conference of Mathematical and Computer Modeling, August 2-5, 1989, Chicago, Illinois, pp 410-412.

PUBLICATIONS (Continued):

- 10) M. Rashidi, M.L. Adams, "Improvement to Prediction Accuracy of Stability Limits and Resonance Amplitude Using Instability-Threshold-Based Journal Bearing Rotordynamics Coefficients", **Proceedings of the 4th International Conference on Vibrations in Rotating Machinery**, September 13-15, 1988, I.Mech.E., C 311/88, pp. 235-240
- 11) M.L. Adams and M. Rashidi, "On the Use of Rotor-Bearing Instability Threshold to Accurately Measure Bearing Rotordynamic Properties", **ASME Trans., Journal of Vibration Stress, and Reliability in Design**, Oct. 1985, pp. 404-409